

The University of Chicago

ANTICIPATIONS, BUSINESS PLANNING
AND THE CYCLE

A PART OF A DISSERTATION SUBMITTED
TO THE FACULTY OF THE DIVISION OF
THE SOCIAL SCIENCES IN CANDIDACY FOR
THE DEGREE OF DOCTOR OF PHILOSOPHY

DEPARTMENT OF ECONOMICS

1936

By
ALBERT GAILORD HART

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SUMMARY

I. Business plans based on anticipations, 3.— II. The optimum plan under subjective certainty, 7; its revision when anticipations change, 11; generalisation for monopolistic competition, 13.— III. Uncertainty leads to flexibility in planning, 15; capital-market uncertainty leads to "liquidity," 20.— IV. Breakdown of anticipations helps explain business cycles, 21.

I

THE NEED FOR AN EXPLICIT RECOGNITION OF ANTICIPATIONS AS "ECONOMIC DATA"

(1) Even before the onset of the great depression, there was a strong feeling among economists that the chief problem before them was that of business fluctuations; and this feeling has been intensified by the experience of the last few years. With the recent revival (in some quarters, at least) of interest and confidence in systematic economic theory, attempts are being made to apply the "theory of value and distribution" to this all-important problem. These attempts, however, have so far not been conspicuously successful; and for reasons which will appear presently it seems to the present writer that further clarification of the relevant aspects of "value theory" is called for before it can be made very useful for this purpose.

1. The writer is indebted to a number of theorists working on problems allied to that of this article — in particular Dr. J. R. Hicks, Mr. Kenneth Boulding, Mr. Nicholas Kaldor, Mr. Victor Edelberg, Mr. Sune Carlson, and Mr. Milton Friedman — for criticism and suggestions and for permission to read some of their unpublished manuscripts. Professors Schultz, Knight, Viner and Yntema of the University of Chicago (who supervised the writer's work for the doctorate) and Professors Hayek and Schumpeter have read parts of the dissertation from which this article is drawn and offered very helpful criticisms. The writer is also under obligation to Professor Erik Lindahl for permission to read an unpublished manuscript and for suggestions in correspondence, and to Professor F. W. Taussig, whose concept of "discounted marginal productivity" led to a study of anticipations.

(2) The so-called "theory of value" (by which, of course, we mean the "theory of the determination of outputs and of relative prices in an economy motivated by the search for maximum private advantage") has for very good reasons always remained special-case analysis rather than study of the most general cases conceivable. A truly general economics, in fact, could scarcely have any content beyond a set of definitions and the proposition that a rational seeker of maximum utility (or maximum profit) will operate on the marginal principle. Economists have usually felt — as the writer thinks, correctly — that the concrete situations they wished to understand could best be grasped by eschewing complete generality and analyzing simplified special cases taking in the characteristic elements of the real problems at issue. The development of theory has consisted largely in adjusting the assumptions defining the special cases studied to new sets of concrete problems. Throughout this development, however, the basic procedure has remained what it was with Adam Smith: the tracing out of the effects of self-interest in the assumed circumstances.

An example of this evolution which is much in the minds of theorists in the last few years is the development of the theory of imperfect competition. It is true that for questions of the type the founders of systematic theory were interested in the nineteenth century doctrine of perfect competition (as amended toward the end of the century) is still very useful. It gives very satisfactory explanations (e.g.) as to why trade should continue in both directions between New York State and Georgia even tho wages are much lower in Georgia, as to why a new Buick costs more than a Ford, as to what would happen to liquor consumption if liquor taxes were greatly reduced, or as to why foodstuffs tended to rise in price relative to manufactured goods in the England of a hundred years ago. A theory that can answer these questions deserves respect. But with other questions established doctrine of the pre-war type has proved much less helpful. Such problems as that of price-making in trades where there are but few competing firms, that of advertising, that

of retail price maintenance, do not lend themselves to solution by the traditional theory of perfect competition. The remedy has therefore been adopted of working out special cases whose assumptions have more relevance to these phenomena, tho without surrendering the fundamental tools of traditional analysis; and at least part of these problems have thus been brought within the realm of things of which economists can give reasonably simple and satisfactory explanations.

(3) The aim of this essay is to work out a similar adaptation of accepted doctrine to the problems of business fluctuations. In going over into this field, however, we are obliged to give up one of the analytical tools on which economists have most relied. The "solutions" of the "problems" theorists have set themselves are regularly arrived at by finding positions of *equilibrium of the market* (whether the market is a single "industry" or a whole economic system). Transition problems, so far as they are brought in, are dealt with by the rather clumsy expedient of distinguishing short-run from long-run equilibrium. But in the theory of fluctuations it is the processes of transition set up by a disturbance, rather than the final equilibrium position toward which they are supposed to tend, which are of primary importance. Equilibrium of the market (except in the sense of day-to-day identity of amounts bought with amounts sold) is accordingly not a serviceable tool for this range of questions.²

A closer examination shows, however, that to give up the use of market equilibrium does not deprive us of all aid from traditional theory. For underlying the notion of equilibrium of the market is that of *equilibrium of the economic unit* (that is, equilibrium of the business firm and equilibrium of the so-called "consumer"—more strictly the "household"). In a sense which will be described presently, the units may be

2. It is the illegitimate application of equilibrium notions of this sort to transition problems, in the writer's opinion, which has balked attempts to blend "value theory" and "monetary theory." Cf. Professor Hayek's account of the effects of a change in the rate of voluntary saving in *Prices and Production* (London, 1931).

said to be in perpetual equilibrium, whatever may be the state of the industry to which they are attached or of the whole economy; so that with proper interpretation most of the accepted doctrine on the individual and the firm may be applied to transition periods. The notion of *equilibrium of the firm* (leaving the household on one side) will be the foundation of this essay.

(4) Once equilibrium of the market is abandoned, however — as it must be for the study of fluctuations — *anticipations* take on a much greater importance than they have in the problematics of the classical tradition. Since “equilibrium” is traditionally regarded as a condition of things which will maintain itself unchanged through time if let alone, it is not ordinarily necessary to distinguish between present and future prices: no confusion is involved in supposing that present prices are expected to hold. When markets are in equilibrium, therefore, equilibrium of the firm may legitimately be described in terms of a simplified set of “data,” namely: present buying-prices, present selling-prices, a current rate of interest, and a “production function” expressing relations between input and output (both treated as constant rates of flow through time).³ But when markets are in disequilibrium prices may be expected to change through time; and plans for input and output may envisage a changing scale of operations. The “data” on the basis of which operations are planned must therefore be taken to include anticipated future prices as well as current prices; and the “production function” must be taken to include alternatives under which rates of input and output vary, in addition to alternatives under which they are constant through time. The somewhat more generalized form of the theory of the enterprise to which this admission leads will be sketched in the second and third sections of this paper; while the fourth section will point out some of its applications.

3. To give “prices” as data implies perfect competition; if competition is imperfect “supply-curves” should be read for “buying-prices” and “demand-curves” for “selling-prices.”

II

EQUILIBRIUM OF THE BUSINESS PLAN
UNDER SINGLE-VALUED ANTICIPATIONS

(1) The next few paragraphs will be devoted to the problem of business planning under the simplifying assumption that anticipations are single-valued; i.e., that the entrepreneur *thinks he knows* exactly what will happen into the indefinite future (or until liquidation) under each plan of carrying on business he may contemplate. (Whether his estimates are in fact correct is not an issue in this connection, so long as he has no doubts of their accuracy.) For the sake of terminological simplicity it will also be assumed provisionally that there is perfect competition for everything the firm customarily buys and sells, tho not for all the things which it owns and uses. This qualification to the assumption of perfect competition is necessary in order to avoid assuming away the existence of the firm. For the scale and the very identity of the firm (which will be defined as *a complex of productive resources* — persons and things yielding useful services — *whose services are directed under a common plan and authority to the maximization of profit* for the owners of the enterprise) depend on the possession by its owners of some sort of *restricted business opportunity*. As a minimum requirement, the services of the persons about whom the firm is organized (and/or the services of their private capital) must be worth more to them than anybody else will offer.

Anticipations are to be thought of as referring to *events* — albeit hypothetical events — of the future. *Market anticipations* will be taken for the present to be definite *schedules* of buying-prices, selling-prices, and open-market interest rates for all relevant future dates; and *technological anticipations* will be taken to give the production-schedules which will arise from each of the different sets of input-schedules that may be contemplated.⁴ A *business plan* will be taken

4. The use of "schedule" in this essay is patterned upon the familiar term "production-schedule"; a "schedule" is a single-valued function of time, giving a value of the variable in question (a price, instantaneous interest rate, or rate of flow of goods or services) for each point of time.

to be a complex of mutually consistent schedules for purchases, use of productive services, production of goods (half-finished and saleable), sales of goods and services, and dealings in capital funds.

(2) Given the entrepreneur's anticipations, his *optimum plan* is that which offers the *maximum present discounted value* (as of the date of planning, which will be referred to as t_0) of *anticipated net receipts*, taking net receipts in a cash-accounting sense as equal at each date to gross receipts from sales and borrowing minus gross disbursements for purchases and for payment of principal and interest on the firm's debts. This is the same thing as the plan under which *present income* is a maximum, if income is defined (in accord with the tradition of economics) as what the capitalist-entrepreneur expects to be able to withdraw during the current accounting interval without impairing the firm's net worth; for income in this sense equals interest on the net worth, and the net worth must be identical with the present discounted value of net receipts. It should be remarked, however, that the criterion of maximum present income (or that of present discounted worth of anticipated income) when income is defined in the standard accounting sense — as receipts from sales minus operating expenses, depreciation and maintenance — may or may not coincide with that of maximum discounted net receipts, according to the way depreciation is reckoned.⁵

(3) This optimum plan may be thought of as being arrived

5. The criterion of maximum discounted net receipts, which the writer has adopted as the most natural extension of the traditional "maximum net receipts," is used by several of the writers in English on anticipations with whose work the writer is acquainted. Cf. H. Hotelling, "The Economics of Exhaustible Resources" (Journal of Political Economy, xxxix, No. 2 [April, 1931]), J. R. Hicks, "Wages and Interest, the Dynamic Problem" (Economic Journal, vol. xlv, No. 179 [September, 1935]), and the unpublished manuscripts of Mr. V. Edberg. Mr. Kenneth Boulding, however, in "The Theory of a Single Enterprise" (Quarterly Journal of Economics, vol. xlix, No. 3 [May, 1935]) proposes as criterion the maximization of the average rate of return on capital over the life of the enterprise; and Professor G. C. Evans in Mathematical Introduction to Economics (New York, 1930, pp. 143 ff.) maximizes undiscounted net receipts

at by successive approximations. If a provisional plan is laid out, various possible *alterations*⁶ may be considered, and any alterations which promise to increase the present value of gross receipts more than the present value of gross outlays (or to decrease the present value of gross outlays more than that of gross receipts) will be made, giving a corrected provisional plan. When large alterations which will increase the present value of net receipts can no longer be found, smaller alterations may be considered. In the end a plan can be found under which no alteration promises to increase the value of net receipts, all alterations having either unfavorable or neutral consequences by this test. If all types of input and purchases are continuously variable, all finite alterations will have unfavorable effects, and infinitesimal alterations neutral effects. When such a plan is found we may say that *the firm's business plan is in equilibrium* at its optimum position; but as we shall see shortly this does not require that *operations* should be in equilibrium in the sense that the entrepreneur has settled upon an unchanging rate of input and output.

(4) Subject to certain further simplifications, the conditions for equilibrium of the plan may be stated in terms of marginal equalities. For this purpose it is necessary to assume that the firm buys productive services as such (and not indirectly through the purchase of goods which yield services) and that the price expected to be paid for services is uniform for each date, however much or little is to be bought. If now a small alteration in the input of some one type of service-input at a particular date is contemplated, and if its effects can be confined to an alteration of one type of output at another particular date, the relation is very simple: the ratio of the present discounted value of the buying-price of input to that of the selling-price of output must equal the marginal-productivity of input of the date and type in question in

6. The term "alteration" is used in this essay to denote a contemplated modification in a plan under consideration. The standard term "variation" is unsatisfactory here on account of its temporal connotation, since plans will be contemplated under which input and output vary through time. An "alteration" is always a difference between two possible plans which are under comparison.

terms of output of the date and type in question; or, *discounted marginal-cost-of-input equals discounted marginal-revenue-of-input equals marginal-productivity multiplied by discounted marginal-revenue-of-output*.⁷ But of course even simple input-alterations may be made to result in output-alterations which are qualitatively and temporally complex; and in some cases it may be impossible to find temporally simple resulting output-alterations at all. The economically significant margins of variation, moreover, ordinarily involve complex input-alterations.⁸

(5) It is more realistic to assume that at least part of the firm's service-input springs from purchased *sources of services* (such as machines) which both yield a flow of services lasting some time and come in units which are of appreciable size for the firm which buys them. In this case we have instead of marginal equalities a set of *inequalities*. at any date when the firm plans to buy such sources of services, to buy one more would increase the discounted value of gross outlays more than that of gross receipts, and to buy one less would decrease the discounted value of gross receipts by more than that of gross outlays. We may think of the firm as having two valuations for such sources of services, which we may call the *increase-value* and the *decrease-value*, representing the present value of the changes in gross receipts which would ensue if the firm had one more or one less unit of the source in question. The firm will plan to buy (or produce) such

7. "Marginal-cost-of-input" may be defined as the limit (as the duration and intensity of the input-alteration both approach zero) of the ratio of the alteration in money outlays to the alteration in input. "Marginal-revenue-of-output" (the "marginal revenue" of the imperfect competition theorists) is the limiting ratio of receipts-alteration to output-alteration, "marginal-productivity" the limiting ratio of output-alteration to input-alteration, and "marginal-revenue-of-input" the limiting ratio of a receipts-alteration to the corresponding input-alteration. It will be noted that all these relations are anticipated, and that each involves a time-relation. For a fuller account of the problem of imputation in terms of disequilibrium see the author's paper in the forthcoming volume of essays in honor of Professor Taussig, edited by Dr. E. S. Mason.

8. The formulation of the text is so general that it applies equally to a new enterprise under consideration and to a going concern.

sources for dates when the increase-value would otherwise exceed the cost of acquisition; and on the same principles it will plan to sell used equipment whenever the decrease-value (for equipment in run-down condition) would otherwise drop below what could be realized by sale.

(6) Equilibrium of the plan will involve equilibrium of operations only in special circumstances. Equilibrium of operations would imply that buying-prices and selling-prices were expected to be constant through future time at their present levels, that the present adaptation to these prices was satisfactory, that no variation in technological conditions was expected, and that continuance of the present scale of purchased input would not involve either an increase or a decrease in the flow of services from sources of services owned by the firm, such as machinery and mineral reserves — or conceivably it might imply an accidental balance of different anticipated changes. The expectation of rising selling-prices, of falling buying-prices or interest rates, or of increasing productivity for a given volume of purchased input (whether due to external changes in conditions, to changes in methods, or to growth of the firm's equipment) will tend to favor plans for expanding output; and the expectation of changes in the opposite direction will favor plans for contracting operations.

(7) If anticipations are revised, a corresponding revision is necessary to bring the business plan again to equilibrium. So long as we assume that the revised estimates are considered perfectly accurate (the entrepreneur recognizing that he has erred in the past, but not drawing the inference that he may err again!), the principles governing the laying out of the new optimum plan will be identical with those just described. Upward revisions of selling-price anticipations or downward revisions of buying-price or interest anticipations will plainly favor upward revision of production-schedules and input-schedules, and revisions of anticipations in the contrary sense will favor downward revision of plans for operations.

The effects of revisions applying to particular items of input or output will of course be primarily upon the input-

schedules or production-schedules immediately concerned. But changes in the anticipated course of prices for anything bought (e.g.) will tend to influence the use of substitutes in the opposite direction and that of coöperating agents in the same direction as the item whose buying-price-schedule is altered. Since a given type of input at one date is likely both to compete and to coöperate with the same type at various other dates, the time-shape of the input-alteration resulting from a revision of the buying-price-schedule need not bear any simple relation to the time-shape of the revision. This effect of a change in buying-price anticipations upon input-plans is of course the analogue in terms of anticipations of the "demand for resources" of equilibrium analysis.⁹

(8) In any revision of plans we may take it that production-schedules will rarely be appreciably changed for the interval just following the date when anticipations are revised. The reason for this is that input of items purchased which affects output of the near future, insofar as it is still under control, coöperates chiefly with input which (being past) cannot be changed, and its productivity curves must be very steep. Or (to put the same thing in different terms) most of the services which will affect output of the next few months will flow from goods in process, etc., owned by the firm at the date of revision; and terms of sale for such goods are likely to be so poor and their degree of specialization so high that they will still be used in production even tho in consequence of the revision their discounted marginal-revenue-of-input of their services is much below expectations. In such circumstances an appreciable decrease of purchased input for output of the near future will lower physical output and gross revenue nearly proportionately, with but little saving in cost; while an appreciable increase of such purchased input, for lack of coöperating input, can increase output and gross receipts but little. Insofar as services used in the near future will coöperate with other services not yet contracted for,

9. Cf. the author's forthcoming paper on Imputation and Demand for Productive Resources in Disequilibrium, referred to in note 7, above.

however (as is the case for output of the remote future), there may still be immediate effects of a revision of anticipations upon input; and this applies *a fortiori* to purchases of durable production goods.

(9) The argument down to this point has been developed under an assumption of perfect competition. If this is dropped, our conception of the market situation becomes much more complex. We must now assume that the entrepreneur believes his buying-prices and selling-prices are affected by his operations — and in fact a given price on a given date may be affected not only by purchases or sales of the item in question and of other items on that date, but also by dealings on other dates. Nevertheless, if the entrepreneur (as is assumed throughout this section) really thinks he knows what will happen, he can presumably calculate a discounted marginal-cost-of-input and a discounted marginal-revenue-of-input for any input-alteration (simple or complex) which he may contemplate; and the principles of analysis are unchanged.

This must be qualified, however, if the rates of interest at which the firm deals are influenced by its volume of dealings, since this affects the criterion of maximum present value. While the case in which a borrower has substantial monopoly power on the markets where he borrows seems to be considered too unrealistic to be included in discussions of the theory of monopoly, this is not the only assumption under which such a variation of rates with the volume of dealings might come in question. In the first place, if there is a spread between the rate at which the entrepreneur can invest outside his enterprise and the rate at which he can borrow, the rate applicable to calculations as of any date will depend on whether the firm plans to be using borrowed funds at that time or whether the entrepreneur will be withdrawing funds for outside investment. In the second place, the firm's creditors are likely to think the risks of lending (largely personal risks — i.e., doubts of the honesty, capacity or good fortune of the borrower) are higher if the firm's debt is heavy, and therefore will charge a higher "risk-premium" if the firm expands its borrowings. But from the borrower's standpoint

the "risk-premium" and "net interest" are both simply charges incurred by borrowing; and if their sum goes up with the size of his debt, the *marginal-cost-of-borrowing* will be appreciably higher than the rate of interest paid. This marginal-cost will then be the rate appropriate to the firm's calculations.¹

Since different plans will imply different schedules of marginal-cost-of-borrowing, the present discounted values obtained by discounting at the corresponding rates are not fully comparable. A plan for operation on a large scale will imply large borrowings and a high cost of borrowing; so that its net receipts are likely to be undervalued as compared with those of a plan for a smaller scale of operations, even tho the latter shows smaller net receipts (after deducting contract interest and repayments of the principal of the firm's debts) for every date. To compare plans involving different terms of borrowing requires the use of the same criterion in valuing each plan. Ordinarily we may expect the optimum plan to be superior to most alternatives either in terms of the schedule of cost-of-borrowing it implies or in terms of the schedules they imply. If, however, each of two alternatives shows a larger value than the other when discounted at its own rates, there is no solution except by appeal to an intermediate schedule (which may arbitrarily be set up as a rule of valuation) or ultimately by appeal to the entrepreneur-capitalist's taste in income-schedules.²

(10) The anticipations standpoint has little to add to the doctrine of sales-promotion as developed by the imperfect competition theorists, insofar as sales-promotion is devoted

1. To take an example in finite increments, we may suppose that a firm owes \$100,000 on which it pays 5% per annum and can increase its debt to \$110,000 only on condition of paying $5\frac{1}{4}\%$ on the whole debt. To borrow the extra \$10,000 will then raise the interest load from \$5,000 to \$5,775 per annum, or by $7\frac{3}{4}\%$ on the extra \$10,000. It would be more profitable to part with \$10,000 worth of investments yielding $7\frac{1}{2}\%$, under these circumstances, than to borrow the \$10,000 at $5\frac{1}{4}\%$. Frequently, of course (as when first-mortgage holders feel they are adequately protected), the increase in rate applies only to part of the debt.

2. This difficulty was pointed out to the writer by Dr. Erik Palander.

to altering the opinion of buyers as to the character of the goods or of their own needs. There is another possibility, however, affecting buying-markets as well as selling-markets — namely, the effect of our firm's publicity, etc., on the prices which its customers, suppliers and competitors expect it to offer. The costs of conveying one impression rather than another will presumably not be heavy; but the effect upon market conditions may be profound. In general both the demand of customers and the terms of supply offered by suppliers will be less elastic (and therefore more favorable to our firm) if they believe that our firm will not offer more favorable terms in the next few months than at present but will after that. The theory of monopoly therefore has a very different complexion according as we do or do not assume the monopolist to be candid as to his future price policy.

III

BUSINESS PLANNING UNDER MARKET UNCERTAINTY ³

(1) The assumption of single-valued anticipations, with which we have operated so far, is of course far from realistic. More generally, entrepreneurs' estimates for the future are to be regarded as uncertain. If a selling-price (e.g.) is to be estimated for any future date, a guess can be made as to where it will lie; but the entrepreneur will not have perfect confidence in his guess. In the discussion which follows, for terminological simplicity, we shall revert to the assumption of perfect competition; and market anticipations (reduced by this assumption to price anticipations) will be assumed to have the following properties:

(a) *Expectation-schedule*: The entrepreneur is supposed to have a definite expectation (in the sense of probability theory) for the price at each relevant future date. This need not coincide with the "most probable price" for a given date, since the probability ascribed to prices above the most prob-

3. No account is taken in this article of technological uncertainty. Since input-output relations are in many parts of the economy very uncertain, this greatly restricts the generality of the argument.

able need not be symmetrical with that ascribed to lower prices; but we may think of the expectation as near the most probable price.

(b) *Diffusion*: The entrepreneur is supposed to recognize the possibility of various prices higher and lower than the expectation, and to put numerical probability-values on each; estimates for the near future will normally display less diffusion than estimates for more remote dates.

(c) *Anticipation of convergence*: The entrepreneur is supposed to expect that he can reduce the dispersion of his estimates for any given future date as that date approaches.

(2) An entrepreneur who expected no information that would enable him to improve his estimates between t_0 , the date of planning, and a later date t_1 , assuming him to have no aversion to risk and no particular liking for it, would find it his best policy to lay out his plans as if his expectation-schedules of prices were single-valued expectations. Similarly, an entrepreneur who was obliged to make all his decisions as to volume of operations in the present would be unable to use fuller information as it came in, and would have to act on what was available. But the normal case is that the business man expects to be in receipt of additional information bearing on markets at most future dates long before he will have been forced to make all the decisions affecting output. His decisions, moreover, need not in all cases be made at any definite interval in advance of the date in question: some decisions may be advanced or postponed according to circumstances. The entrepreneur's fundamental means of meeting uncertainty is the postponement of decisions till more information comes in — that is to say, the preservation of *flexibility* in his business plan.⁴ But flexi-

4. By making futures contracts, and by insurance, uncertainties may be eliminated for the individual entrepreneur, and this quite aside from the question whether the thing insured is strictly an "insurable risk." So long as their contract remains enforceable, e.g., the Swiss landlords' insurance against vacancies in apartments offered at a fixed rental is every bit as good an elimination of uncertainty as fire insurance, tho the "vacancy risk" is in principle uninsurable. On the other hand risks which are insurable remain as uncertainties if uninsured.

bility involves costs; "haste makes waste;" and ordinarily a given production-schedule can be produced at lower cost if the entrepreneur has adapted his input to it well in advance than if plans are improvised. The next few paragraphs will deal with the ways and means of preserving flexibility, and with the balancing of its costs against its advantages.

(3) We may begin with uncertainty of the selling-market. In the event that the entrepreneur's experience leads him to revise downward his expectation-prices (a contingency whose possibility must be recognized in laying plans) it will not be possible to cut down production suddenly without serious wastes, for reasons we have already examined. But in such circumstances the entrepreneur can protect himself to some extent if he has storage facilities; sales may be cut down immediately and the excess of production over sales may be put into inventory; meanwhile steps may be taken to cut down production for later dates (on which greater savings in outlays are possible) and work off the inventory gradually. This could be done with a normal minimum inventory of zero; but a normal minimum greater than zero is necessary to make it possible to take advantage of an unexpectedly favorable market, since otherwise sales cannot be increased quickly except through a quick increase of output at prohibitive cost. In case the finished product will not stand storage, a substitute for an inventory of finished goods may be found in an inventory of half-finished goods (such as automobile parts). The same remedy is available if the firm is producing many products from the same half-finished goods and the distribution of demand among the saleable products is uncertain.⁵

(4) Uncertainty of the buying-market may operate similarly to make it worth holding normal inventories. The situation is not quite symmetrical with that on the selling-market, however, since immediate adjustment of purchased input is economical where the thing purchased coöperates

5. The maintenance of inventories of course implies low storage costs (at least up to a certain amount in storage) on the one hand and unwillingness to rely on speculative markets to make the indicated adjustments on the other.

chiefly with future rather than with past input. Insofar as input to be purchased in the near future coöperates with the services of goods owned by the firm, however, an inventory of the latter is required to permit quick adjustments of purchases to market changes; and reciprocally, if the goods owned by the firm are specialized and require the coöperation of purchased input whose market is uncertain an inventory of the latter is a protection. With both input-items and products, of course, an entrepreneur who expects a sharp rise of prices will tend to hold inventory as a speculation.

(5) Another means of meeting uncertainty is the choice of products, and the choice of processes for turning out products, with a view either to avoiding uncertainty or to being able to defer decisions. If either of two products offers equal profits in the event of expectation-prices turning out to be actual prices, the one for which the dispersion of anticipations is least will be preferable, other things equal. If a number of possible products compete on the selling-market, their uncertainties may be offsetting (the circumstances in which one will sell at a low price being circumstances in which others will command high prices), so that to produce several of them within one firm will reduce uncertainty.⁶ On the other hand if the degree of uncertainty of the prices involved is the same, a firm will have a better expectation of net receipts if it chooses a product whose production does not involve very heavy commitments till near the date of sale.

The choice of processes is affected similarly.⁷ If markets

6. Thus, as Mr. Nicholas Kaldor points out, a manufacturer of ladies' handbags would have a much more uncertain market if he produced only one style than he has if he produces fifty styles. Mr. Kaldor suggests also that this sort of situation is likely to prevent the full realization of the economies of large-scale production, unless the single firm is large enough to have several specialized plants. Perfect competition is therefore incompatible with such a selling-market unless there is room for a large number of firms each with several large plants.

7. Professor Gunnar Myrdal, in his "Prisbildningsproblemet och Föränderligheten" (Uppsala, 1927, pp. 192-253) gives an elaborate and useful account of the effect of uncertainty on the structure of the enterprise, with special regard to fixed capital; tho his treatment is somewhat marred by the notion of "objective price risk," which is plainly unacceptable.

are very uncertain, it will pay to avoid heavy commitments in fixed capital (which must either be left idle or operated at a loss when markets are unfavorable) even tho they would promise to pay under a scheme of price-anticipations with the same expectation-values but less dispersion. By the same reasoning, processes under which it is easy to shift materials from one product to another, or to substitute one material for another conveniently in producing a given product, will be preferred. How far it will pay to go in sacrificing economy (in the event that markets develop according to expectations) to security (in the event that they do not) will always depend on the degree of dispersion of anticipations.

(6) The effect of uncertainty in discouraging investment in fixed capital points to the analogy which is often drawn between the effects of risk and those of high interest rates; and a brief digression to consider this analogy may be in order. It is reasonable to place both great uncertainty and high interest in the class of forces discouraging the use of fixed capital; but it should be noticed that uncertainty also encourages carrying inventories. There is accordingly no guarantee that a reduction in the degree of uncertainty will lead to an increase in the firm's borrowing, since the capital released from inventories may fill fixed capital requirements.

There is another ground for the analogy between high interest and great uncertainty which is satisfactory if carefully interpreted but misleading otherwise. Uncertain returns are sometimes spoken of as "discounted" not only for futurity but for uncertainty. This implies that returns in each possible contingency are given a separate present value (less than the gross value not only because they are future but because they may not happen). But in embarking on any particular policy the entrepreneur assumes not the chance of getting a certain amount or nothing but a cluster of contingent opportunities which must be valued as a whole. If all contingencies are taken into account and given probability values, no further "discounting" is called for except for futurity.

But as Professor T. O. Yntema points out, practical calculations are often made not in terms of a full set of possible outcomes, but in terms of the *most probable course of net income*. If we make the reasonable assumption that the distribution of possible incomes is so skewed that the "most probable income" for each interval exceeds the expectation, there is a systematic error in this sort of calculation; and as the dispersion of estimates is greater for later dates the error is likely to increase. If this be so, the contrary systematic error introduced by "discounting" at a rate above the appropriate interest rate may afford a rough-and-ready correction.

(7) To return to the argument, we have still to consider uncertainty of the capital market. This, like other sorts of uncertainty, requires the maintenance of flexibility; but the particular type of flexibility which here comes in question is *liquidity*, meaning the maintenance of a cash balance (or unused borrowing power, or a stock of assets of types which can be liquidated without affecting operations) in excess of turnover requirements.⁸ By being "liquid," the firm is in a position to take advantage of opportunities which call for making extra disbursements or deferring expected receipts, or to protect itself in the event of unfavorable developments which push gross receipts below expectations or call for unexpected outlays, without the need of financial assistance from outside. Similarly, adverse capital-market developments (such as unexpected refusal of a creditor to renew a loan) will not be crushing if the firm is liquid. In fact, the maintenance of liquidity — since it will improve the firm's rating with money-lenders — is calculated not merely to protect against financial perils but to reduce the risks which threaten the firm.

Even tho there is no uncertainty of the terms of financing available, there may still be need for liquidity if those terms involve *capital rationing*: if, that is, the firm's ability to get

8. On the relation between uncertainty and liquidity cf. Dr. J. R. Hicks, "A Suggestion for Simplifying the Theory of Money," *Economica* (New Series), No. 5 (February, 1935), and J. M. Keynes, *General Theory of Employment, etc.*

in outside capital is limited otherwise than by the interest it must pay. This is a very common situation, as lenders (for good reason) usually refuse to put into a business more than a certain proportion of the equity, and the original owners normally cannot bring in further equity funds without losing control. In these circumstances, the firm must expect to meet its disbursements from the proceeds of current sales or out of its liquid assets. A firm with no balance above turnover requirements may be stripped of working capital or even thrown into liquidation by an interval of unexpectedly low selling-prices or unexpectedly high buying-prices, so that a temporary operating loss may permanently cripple the firm or even crush it. Similarly, if the firm is illiquid it may have to remain inactive while favorable contingencies pass by. In these circumstances it is definitely the part of prudence to maintain a normal excess of cash resources above minimum requirements.

A by-product of capital rationing is a presumption in favor of avoiding risks. The risk of moderate operating losses (presumably entailing a reduction of the firm's rationing-allowance of capital) may be compensated by the hope of operating gains of the same order of magnitude. But unless the entrepreneur is doubtful of his own solvency his attitude toward larger losses must be different, since they may preclude all hope of gains thereafter. In liquidation the normal excess of a firm's going-concern value over the scrap-value of its physical assets evaporates; and the risk of this loss added to the operating loss will far outweigh the chance of an equal operating profit. This offers a "rational" ground for "antipathy to risk."

IV

ANTICIPATIONS AND BUSINESS FLUCTUATIONS

(1) From the standpoint of anticipations, a situation favorable to an expansion of business volume and employment may be defined as one in which business plans are predominantly for an expansion of operations, while a situation favorable to a downswing is one in which business men mostly

plan to contract. Inquiry into the causes of fluctuations may then naturally be put in the form of an investigation of the conditions under which business men in general will plan to expand or contract, of the conditions in which such plans can be carried out, and of the conditions in which an attempt to carry them out will break down the anticipations on which they are founded and lead to general revision. This program, however, is far too ambitious to be carried out within the limits of this article; and the writer proposes to restrict himself in this final section to an inquiry into the conditions for fulfilment and for non-fulfilment of anticipations for a whole economic system.

(2) The first thing required for such a study is a specification of what is meant by fulfilment of anticipations. If we consider two points of time, the original moment of planning (called t_0) and a date slightly later (called t_1), we may describe *fulfilment of anticipations* for any enterprise between these dates as follows:

(a) Events between t_0 and t_1 must have followed the expectation-values of the t_0 anticipations.

(b) The expectation-values of t_1 estimates for dates later than t_1 must be the same as the expectation-values of t_0 estimates for the same dates.

(c) The dispersion of t_1 estimates for later dates must be less than that of t_0 estimates for like dates, and the shrinkage of dispersion must be in accordance with the anticipations of convergence held at t_0 .

Failure of any of these conditions will be called a *surprise*; and surprises may be *agreeable* or *disagreeable*. If condition (a) does not hold, this constitutes a *primary surprise*. If condition (b) does not hold, this constitutes a *secondary surprise with respect to expectation-values*, and if condition (c) does not hold we have a *secondary surprise with respect to convergence*. Surprises will be termed agreeable if buying-prices turn out lower than expected or selling-prices higher, or if convergence is greater than expected (dispersion of estimates less than expected), and disagreeable in the contrary case.

(3) It will be observed that primary surprises are *experienced* by the firm in a much more immediate sense than secondary disappointments. The prices at which the firm has dealt and the volume of its purchases and sales between t_0 and t_1 are historical facts at the date t_1 , so that it is known how far events have diverged from expectations. (It should be noted, however, that if the firm has some monopoly power such an experience requires interpretation before it can reveal market conditions.) Secondary surprises, on the other hand, are matters of the interpretation of events only part of which are experiences of the firm. They hinge on the receipt or non-receipt of expected information, and on the cropping up of unexpected information. The character of primary surprises between t_0 and t_1 will influence the t_1 estimates, it is true; but political events, the movements of business barometers, etc., affect the interpretation of primary surprises and of information bearing directly on the prospects for the firm's markets.

(4) Monetary theory offers a technique for working out the conditions of general primary surprises as to receipts. If we fix our eyes on consumption markets, the problem may be put in terms of the circumstances in which aggregate receipts from sales to consumers and governmental bodies may fall below or exceed the expectations of business.⁹ By the device of drawing up *anticipated cash accounts* and *experienced cash accounts* for consumers, business firms, banks and governmental bodies and combining these accounts for each group, this problem may be reduced to monetary truisms. The conclusion arrived at is that receipts from sales to consumers and government will fall short of expectations (which means a tendency toward general disagreeable surprises) if any of the following conditions holds:

(a) Disbursements of business firms to consumers and government on current account (for purchase of services and

9. This seems to the writer the only reasonable way to pose the "deficiency of purchasing power" problem, except on the inappropriate assumption that operations were in equilibrium a short while before the period analyzed.

for taxes) are less between t_0 and t_1 than business men had planned at t_0 .

(b) The balance of capital transactions between business firms and other economic units (consumers, banks and government) is more "favorable" to business than had been planned at t_0 .

(c) There is a net destruction of circulating medium between t_0 and t_1 through action of the banks or of government.

(d) Consumers increase their cash balances between t_0 and t_1 .

(e) Business men *plan* at t_0 to increase their cash balances between t_0 and t_1 .

(f) Business men planning to buy goods from other business men expect to disburse more for these purchases than the prospective sellers expect to take in.

Needless to say, if some of these conditions are reversed, they may offset each other: net creation of circulating medium by banks, e.g., may offset the unfavorable effects of an attempt by business men to accumulate cash; or if the firms selling goods to other firms expect to take in more than the buying firms expect to pay out, this may offset accumulation of cash by consumers.¹

(5) Even tho conditions for average fulfilment or non-fulfilment of expectations with respect to receipts between t_0 and t_1 can be thus simply stated, this does not necessarily give conditions for fulfilment or non-fulfilment *with respect to selling-markets*. If the firms which are disagreeably surprised at the outset react by cutting prices to such an extent as to make their receipts equal or exceed expectations (tho of course at prices decidedly below those anticipated), this will drain expenditures away from other firms, so that there need not be any offsetting agreeable surprises elsewhere. More important, if the firms suffering initial disagreeable surprises curtail their outlays while the firms enjoying agreeable surprises do not expand theirs, consumption markets

1. Lack of space prevents the working out in this article of the monetary truisms underlying this argument. The writer hopes to publish an explanation of them shortly in another place.

will in general be unsatisfactory. It will be seen, therefore, that even in the absence of forces working at the outset to induce general agreeable or disagreeable surprises, the locus of initial primary disappointments may be such as to unleash such forces. If, e.g., the firms whose market estimates turn out to be overpessimistic are in a position to increase their purchases of equipment in case their business improves, while the overoptimistic firms are operating at a low "percentage of capacity" and will not be in the market for equipment whether sales grow or shrink, the distribution of surprises will tend toward business revival; and in the contrary case it will tend toward decline. This consideration suggests a plausible explanation for the observed fact that upward or downward movements of general business conditions are often temporarily interrupted; and in some cases it may even suffice to explain a turn in the cycle. Ordinarily, however, it may be assumed that an upward or downward movement has a momentum sufficient to overcome such random influences, and our explanation must run rather in terms of the influences tending to give a general agreeable or unpleasant character to business surprises and thus either to reinforce the current movement (inducing agreeable surprises on the upswing and disagreeable surprises on the downswing) or to oppose it and bring it to a stop (inducing disagreeable surprises on the upswing and agreeable surprises on the downswing). These forces, in the writer's opinion, are largely to be found in the field of money and credit.

(6) When we turn from primary to secondary surprises, it will at once be plain that economics has no tool for finding just what these will be in given circumstances. There is a general presumption that primary surprises will bring about secondary surprises of the same type (as is implicitly assumed in many discussions of fluctuations). If, e.g., the selling-market of a firm is worse between t_0 and t_1 than was expected at t_0 , this will tend to involve pessimistic revisions of selling-market anticipations for dates later than t_1 . But this presumption does not amount to a rule, even as to the direction of the secondary surprise, much less as to the degree and

duration of the alteration in the expectation-schedule of selling-prices which will result from a given primary surprise. The interpretation of the initial surprise will depend on the political setting, the movements of the business series the entrepreneur in question thinks are important, and the question whether prices are believed to be "abnormally high" or "abnormally low." An agreeable primary selling-market surprise at a time when selling-prices were expected to begin to fall, e.g., might merely lead to an expectation of the decline being postponed a few days; while the same agreeable surprise when prices had been expected to be stable might lead to a revision of the selling-price-schedule for some time ahead.

Secondary surprises with respect to convergence have also a certain degree of relationship to primary surprises. If, e.g., the divergence of experience from expectations between t_0 and t_1 is greater for most firms than they have recently experienced, it is likely to shake their confidence in further estimates. This in turn may be expected to lead to a decreased demand for durable equipment and an increased demand for cash balances; and the forces thus set up, in their turn, will lead to disagreeable primary surprises. But perhaps even more than with shifts in expectation-values, shifts in the degree of uncertainty are linked with political events and changes in the general social atmosphere.²

(7) There is no space in this article to attempt to state a systematic theory of fluctuations in terms of this doctrine of anticipations; but certain general implications for the theory of fluctuations should be pointed out in conclusion.

In the first place, while the introduction of anticipations implies a "psychological" theory of the cycle in that all factors influencing business activity are taken to act through business men's estimates and plans, it does not in the least exclude any "real" or "monetary" factors for which a plausible case can be made out. The use of anticipations as

2. On this relation, cf. J. M. Keynes, *The General Theory of Employment, Interest and Money*, London, 1936, chapters 12 and 15, especially pp. 161-163.

an explicit element in the argument is a matter of analytical mechanism, not of the theory of "ultimate causes."

In the second place, if anticipations are recognized as the driving forces of business enterprise, it must be accepted that these driving forces are not in themselves observables. True, anticipations must be founded upon experience, and thus upon observables of some sort; but the observables involved are so numerous, many of them are so hard to quantify (how does one distinguish between Presidential messages to Congress with indices of +4 and messages with indices of -3?), and their relations are so likely to shift during the course of the cycle that the hypothesis that we can find stable relations between the observable data which presumably underlie business planning and the observable actions which result from it, is not *a priori* very plausible. Statistical experience is also unfavorable to the hypothesis.³ Any theory which purports to give necessary sequences in which one economic event follows inexorably from another is therefore suspect; for anticipations must be introduced as a causal link, and the effects of the first event on anticipations cannot be rigorously determined. Ability to gauge the effects of events and measures of policy on "business sentiment" must in all probability forever be accepted as a much more important tool of forecasting than theoretical analysis.

ALBERT GAILORD HART.

UNIVERSITY OF CHICAGO

3. The studies of Drs. Roos, Evans and Whitman, in which the demand for a product is dealt with as a function not only of the current price of the product and other simultaneous observations but also of the history of prices (represented by derivatives and integrals), are in principle to be regarded as attempts thus to link business reactions with observable data of business planning. Dr. Whitman's study of the demand for steel (Journal of Political Economy, xlii, 1934, pp. 577-594) shows that the inclusion of price history affords a much more plausible interpretation of demand than can be obtained by taking account only of present prices. But the results reached, despite great statistical acuteness, are still far from being a satisfactory basis for forecasting.

